1-1-1975

Test 1183: Belarus 250 Diesel

Tractor Museum
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NEBRASKA TRACTOR TEST 1183 – BELARUS 250 DIESEL

POWER TAKE-OFF PERFORMANCE

Hp	Crank-shaft speed rpm	Fuel Consumption Gal per hr	Fuel Consumption Lb per hp-hr	Hp-hr per gal	Temperature Degrees F Cooling medium	Air wet bulb	Air dry bulb	Barometer inches of Mercury
MAXIMUM POWER AND FUEL CONSUMPTION								
Rated Engine Speed—Two Hours (PTO Speed—557 rpm)								
24.95	1800	1.590	0.440	15.69	air-cooled	73	77	28.877
Standard Power Take-off Speed (540 rpm)—One Hour								
25.02	1744	1.608	0.444	15.56	air-cooled	73	79	28,890
VARYING POWER AND FUEL CONSUMPTION—Two Hours								
22.38	1899	1.437	0.444	15.57	air-cooled	74	82	.....
0.00	1949	0.399	.....	.....	air-cooled	74	82	.....
11.33	1924	0.894	0.545	12.67	air-cooled	74	84	.....
24.09	1798	1.576	0.452	15.29	air-cooled	75	86	.....
5.71	1935	0.616	0.746	9.27	air-cooled	75	87	.....
16.91	1913	1.155	0.472	14.64	air-cooled	75	87	.....
Av 13.40	**1903**	**1.013**	**0.522**	**13.23**	**air-cooled**	**74**	**85**	**28.940**

DRAWBAR PERFORMANCE

Hp	Draw-bar pull lbs	Speed miles per hr	Crank-shaft speed rpm	Fuel Consumption Slip of drivers %	Gal per hr	Lb per hp-hr	Hp-hr per gal	Temp Degrees F Cool-ing med	Air wet bulb	Air dry bulb	Barometer inches of Mercury
VARYING DRAWBAR POWER AND FUEL CONSUMPTION WITH BALLAST											
Maximum Available Power—Two Hours 2nd Gear											
21.00	1730	4.55	1796	6.68	1.592	0.524	13.19	air-cld	74	80	28.875
75% of Pull at Maximum Power—Ten Hours 2nd Gear											
17.39	1331	4.90	1898	5.26	1.317	0.523	13.20	air-cld	75	91	28.817
50% of Pull at Maximum Power—Two Hours 2nd Gear											
11.95	891	5.03	1921	3.68	1.013	0.586	11.80	air-cld	77	97	28.850
50% of Pull at Reduced Engine Speed—Two Hours 3rd Gear											
12.66	947	5.01	1648	4.04	0.977	0.533	12.96	air-cld	77	89	28.860
MAXIMUM POWER WITH BALLAST											
6.66	1552	1.61	1932	5.96	2nd Gear (Creeper)			air-cld	77	90	28.920
21.45	2280	3.53	1798	8.75	1st Gear			air-cld	72	79	28.910
21.81	1801	4.54	1791	6.79	2nd Gear			air-cld	59	74	28.910
21.75	1520	5.37	1802	5.85	3rd Gear			air-cld	74	83	28.930
21.69	1186	6.86	1800	4.74	4th Gear			air-cld	74	83	28.930
20.68	894	8.67	1801	3.65	5th Gear			air-cld	75	86	28.910

VARYING DRAWBAR PULL AND TRAVEL SPEED WITH BALLAST 2nd Gear

Pounds Pull	1801	2000	2098	2058	2009	1889
Horsepower	21.81	21.81	20.20	17.37	14.46	11.37
Crankshaft Speed rpm	1791	1623	1439	1261	1073	893
Miles Per Hour	4.54	4.09	3.61	3.17	2.70	2.26
Slip of Drivers %	6.79	7.40	7.90	7.60	7.50	7.30

TRACTOR SOUND LEVEL WITH CAB	db(A)
Maximum Available Power 2 Hours	87.5
75% of Pull at Max. Power 10 Hours	85.0
50% of Pull at Max. Power 2 Hours	85.0
50% of Pull at Reduced Engine Speed 2 Hours	85.5
Bystander in 6th Gear	82.5

TIRES, BALLAST AND WEIGHT		With Ballast	Without Ballast
Rear Tires	—No., size, ply & psi	Two 11.2/10-28; 6; 20	Two 11.2/10-28;6;20
Ballast	—Liquid	None	None
	Cast Iron	294 lbs each	None
Front Tires	—No., size, ply & psi	Two 6.00-16; 6; 36	Two 6.00-16; 6; 36
Ballast	—Liquid	None	None
	Cast Iron (front end)	352 lbs total	None
Height of drawbar		22 inches	22 inches
Static weight with operator—rear		3430 lbs	2973 lbs
front		2060 lbs	1578 lbs
total		5490 lbs	4551 lbs

Department of Agricultural Engineering

Dates off Test: August 19 to 26, 1975

Manufacturer: VLADIMIR TRACTOR PLANT, USSR

FUEL, OIL AND TIME **Fuel** No 2 Diesel **Cetane No** 51.7 (rating taken from oil company's typical inspection data) **Specific gravity converted to 60°/60°** 0.830 **Weight per gallon** 6.911 lbs **Oil SAE** 30 **API service classification** MS-DG-DM-DS **To motor** 1.921 gal **Drained from motor** 1.673 gal **Transmission and final drive lubricant SAE** 90 **Total time engine was operated** 51 hours.

ENGINE **Make** Vladimir Tractor Plant **Type** 2 cylinder air-cooled vertical in line **Serial No** 298685 **Crankshaft mounted** lengthwise **Rated rpm** 1800 **Bore and stroke** 4.134″ x 4.724″ **Compression ratio** 17.5 to 1 **Displacement** 127 cu in **Cranking system** 12 volt **Lubrication** pressure **Air cleaner** oil washed capron, polyurethane foam and centrifugal precleaner with dust evacuator **Oil filter** full flow centrifugal **Fuel filter** one primary and two secondary filter elements **Muffler** vertical **Cooling medium temperature control** air fan with hydrodynamic drive.

CHASSIS **Type** standard **Serial No** XT3 A25.21.101K.2.2 **Tread width** rear 47.2″ to 58.5″ front 49.8″ to 57.8″ **Wheel base** 69.5″ **Center of gravity** (without operator or ballast, with minimum tread, with fuel tank filled and tractor serviced for operation) Horizontal distance forward from center-line of rear wheels 27.4″ Vertical distance above roadway 47.6″ Horizontal distance from center of rear wheel tread 0″ to the right/left **Hydraulic control system** direct engine drive with throwout level (engaged during test) **Transmission** selective gear fixed ratio **Advertised speeds mph** first 3.9 second 5.0 third 5.8 fourth 7.4 fifth 9.3 sixth 13.6 Creeper gear speeds (limited to 1585 lbs pull) first 1.1 second 1.6 reverse 3.9, 5.0, 5.8, 7.4, 9.3, 13.6 **Clutch** dry single disc, foot pedal operated **Brakes** floating band and pulley type ,operated by two foot pedals which can be locked together **Steering** mechanical **Turning radius** (on concrete surface with brake applied) right 120.2″ left 131.5″ (on concrete surface without brake) right 126.5″ left 148″ **Turning space diameter** on concrete surface with brake applied) right 269″ left 292″ (on concrete surface without brake) right 281″ left 324″ **Belt pulley** 1028 rpm at 1800 engine rpm diam. 11.811″ face 4.72″ **Belt speed** 3170 fpm **Power take-off** 540 rpm at 1744 engine rpm.

REPAIRS AND ADJUSTMENTS: During Drawbar Tests hand throttle lever broke. Tests resumed after repair. During Run-in period transmission shift lever became locked. Run-in continued after freeing.

REMARKS: All test results were determined from observed data obtained in accordance with SAE and ASAE test code or official Nebraska test procedure. Fuel return temperature was 120°F. Six gears were chosen up to 15 MPH (only one gear permitted over 8 MPH), pull on creeper gears restricted by manufacturer .

We, the undersigned, certify that this is a true and correct report of official Tractor Test **1183.**

LOUIS I. LEVITICUS
Engineer-in-Charge

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EXPLANATION OF TEST REPORT

GENERAL CONDITIONS

Each tractor is a production model equipped for common usage. Power consuming accessories may be disconnected only when the means for disconnecting can be reached from the operator station. Additional weight can be added as ballast if the manufacturer regularly supplies it for sale. The static tire loads and the inflation pressures must conform to recommendations in the Tire Standards published by the Society of Automotive Engineers.

PREPARATION FOR PERFORMANCE RUNS

The engine crankcase is drained and refilled with a measured amount of new oil conforming to specifications in the operators manual. The fuel used and the maintenance operations must also conform to the published information delivered with the tractor. The tractor is then limbered-up for 12 hours on drawbar work in accordance with the manufacturer's published recommendations. The manufacturer's representative is present to make appropriate decisions regarding mechanical adjustments.

The tractor is equipped with approximately the amount of added ballast that is used during maximum drawbar tests. Prior to the maximum power run the tire tread-bar height must be at least 65% of new tread height.

POWER TAKE-OFF PERFORMANCE

Maximum Power and Fuel Consumption. The manufacturer's representative makes carburetor, fuel pump, ignition and governor control settings which remain unchanged throughout all subsequent runs. The governor and the manually operated governor control lever is set to provide the high-idle speed specified by the manufacturer for maximum power. Maximum power is measured by connecting the power take-off to a dynamometer. The dynamometer load is then gradually increased until the engine is operating at the rated speed specified by the manufacturer for maximum power. The corresponding fuel consumption is measured.

Varying Power and Fuel Consumption. Six different horsepower levels are used to show corresponding fuel consumption rates and how the governor causes the engine to react to the following changes in dynamometer load: 85% of the dynamometer torque at maximum power; minimum dynamometer torque, ½ of the 85% torque; maximum power, ¼ and ¾ of the 85% torque. Since a tractor is generally subjected to varying loads the average of the results in this test serve well for predicting the fuel consumption of a tractor in general use.

DRAWBAR PERFORMANCE

All engine adjustments are the same as those used in the belt or power take-off tests.

Varying Power and Fuel Consumption With Ballast. The varying power runs are made to show the effects of speed-control devices (engine, governor, automatic transmission, etc.) on horsepower, speed and fuel consumption. These runs are made around the entire test course which has two 180 degree turns with a minimum radius of 50 feet. The drawbar pull is set at 4 different runs as follows: (1) as near to the pull at maximum power as possible and still have the tractor maintain the travel speed at maximum horsepower on the straight sections of the test course; (2) 75% of the pull at maximum power; (3) 50% of the pull at maximum power; and (4) maintaining the same load and travel speed as in (3) by shifting to a higher gear and reducing the engine rpm.

Maximum Power with Ballast. Maximum power is measured on straight level sections of the test course. Data are shown for not more than 6 different gears or travel speeds. Some gears or travel speeds may be omitted because of high slippage of the traction members or because the travel speed may exceed the safe limit for the test course. The manufacturer's representative has the option of selecting one gear or speed over eight miles per hour. The maximum safe speed for the Nebraska Test Course has been set at 15 mph. The slip limits have been set at 15% and 7% for pneumatic tires and steel tracks or lugs, respectively. Higher slippage gives widely varying results.

Varying Drawbar Pull and Travel Speed with Ballast. Travel speeds corresponding to drawbar pulls beyond the maximum power range are obtained to show the "lugging ability" of the tractor. The run starts with the pull at maximum power; then additional drawbar pull is applied to cause decreasing speeds. The run is ended by one of three conditions: (1) maximum pull is obtained, (2) the maximum slippage limit is reached, or (3) some other operating limit is reached.

SOUND MEASUREMENT

Sound is recorded during each of the Varying Power and Fuel Consumption runs as the tractor travels on a straight section of the test course. The dB(A) sound level is obtained with the microphone located near the right ear of the operator. Bystander sound readings are taken with the microphone placed 25 feet from the line of travel of the tractor.

An increase of 10 dB(A) will approximately double the loudness to the human ear.

For additional information about the **Nebraska Tractor Tests** write to the **Department of Agricultural Engineering, University of Nebraska, Lincoln, Nebraska** 68583.

BELARUS 250 DIESEL